

THE BRAZILIAN HYDROPTILIDAE (TRICHOPTERA).

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(With 93 text-figures.)

A PART from a few larval cases which were described by Fritz Müller in 1880 only one Brazilian *Hydroptilid* species has so far been known in the adult state. This is *Mortoniella albolineata* Ulmer 1906.

As a consequence, the collection made by Herr Fritz Plaumann, in Nova Teutonia, is of considerable importance.

It includes eighteen new species contained in eleven genera, of which five are new to science, one distributed throughout North America and Mexico, four erected originally to take Mexican species and, finally, one genus, *Hydroptila*, which is ubiquitous. Records of species in this genus have been made from Europe, Asia, the Far East, India, South Africa, North Africa (with one species from an Egyptian oasis), Madeira, the Canaries, North America, Mexico, Australia, New Zealand and now, Brazil. This Brazilian species, *H. producta*, is closely related to our own *simulans*, and it is interesting to find that the scent-organ apparatus at the back of the head, so far restricted to *Hydroptila*, is fully developed in the South American species.

Of the new genera, particular reference must be made to *Abtrichia*, which contains two species. Of these, *squamosa* is noteworthy as the first *Hydroptilid* to be discovered in which the vestiture of the wings consists of scales as well as of hairs, a condition which prevails in other Trichopterous families. These scales, mainly confined to an overlapping fold of the costa of the anterior wing, are of the nature of androconia and form, probably, part of some scent-distributing or generating apparatus in connection with this fold.

In both the species in the genus there is a considerable modification of the form of the head and also of the basal joint of the antenna, particulars of which are given with the generic description. A similar modification of the antenna occurs in the Mexican genus *Zumatrichia* Mosely 1937, and, as in this genus, the ocelli number only two.

A word must be added as to the nature of the *terrain* in which the captures were made. Nova Teutonia is situated in western Santa Catharina, in a mountainous region near the River Uruguay. Small mountain torrents, waterfalls, bogs and other forms of water abound and, as the station from which collecting is made, is situated at an altitude of between five and seven hundred metres, with a not unduly high temperature, conditions are eminently favourable for the existence of Trichoptera.

It may be added that Herr Plaumann has sent to the British Museum considerable numbers of Caddis flies from families other than the *Hydroptilidae*, though, as might be expected, the *Phryganeidae* and the *Limnophilidae* are not represented.

All the new species here described were collected by Herr F. Plaumann in Nova Teutonia, and the types, in most cases also paratypes, are in the collection of the British Museum.

1. **Diaulus ladislavii** Fr. Müller.

Diaulus ladislavii Fr. Müll., *Arch. Mus. Nac. Rio Jan.*, 3, p. 118, 1880; id., *Zeits. Wiss. Zool.*, 35, p. 68, 1881.

This species is described from a larval case, the adult remains unknown.

2. **Rhyacopsyche hageni** Fr. Müller.

Rhyacopsyche hageni Fr. Müll., *Arch. Mus. Nac. Rio Jan.*, 3, p. 121, 1880; id., *Zeits. Wiss. Zool.* 35, p. 72, 1880; Thienemann, *Zeits. Wiss. Insektenbiol.*, 1, pp. 287-289, 1905; Ulmer, *Deuts. Ent. Zeits.*, p. 385, 1913.

The species was described from a larval case. In 1905, some larvae and pupae were obtained by Thienemann, who was able to give a description and figures of the male genitalia from a mature pupa. A figure is given by Ulmer of the wings of a Paraguan insect which is doubtedly referred to this species.

3. **Peltopsyche sieboldi** Fr. Müller.

Peltopsyche sieboldi Fr. Müll., *Arch. Mus. Nac. Rio Jan.*, 3, p. 124, 1880; id., *Zeits. Wiss., Zool.*, p. 74; 1881.

The species was described from a larval case, the adult remains unknown.

4. **Peltopsyche maclachlani** Fr. Müller.

Peltopsyche maclachlani Fr. Müll., *Arch. Mus. Nac. Rio Jan.*, 3, p. 133, 1880; id., *Zeits. Wiss. Zool.*, 35, p. 74, 1881.

The species was described from a larval case, the adult remains unknown.

5. **Mortoniella albolineata** Ulmer.

Mortoniella albolineata Ulm., *Notes Leyd. Mus.*, 28, p. 98, fig. 104, 1906; id., l.c., 29, p. 44, 1907.

This species is not a true *Mortoniella* and in all probability should find a place in the new genus *Antoptila* described below.

Sta. Catharina, Rio Janeiro, Organ Mts., Tijuca, 500-900 m., E. R. Wagner, 1902 (in the Paris Museum).

Canoptila gen. n.

Ocelli present; antenna with the basal joint long, second short, third and other joints each nearly twice the length of the second; maxillary palpi with the first joint short, the second slightly shorter and globular, third longer than the first, fourth slightly shorter or as long as the third, fifth as long as the third; anterior wing with an oblique apical margin, costal and posterior margins more or less parallel, neuration fairly regular; in the posterior wing, the costal margin is excised towards the centre; spurs 1, 4, 4, that of the anterior leg very fine and transparent.

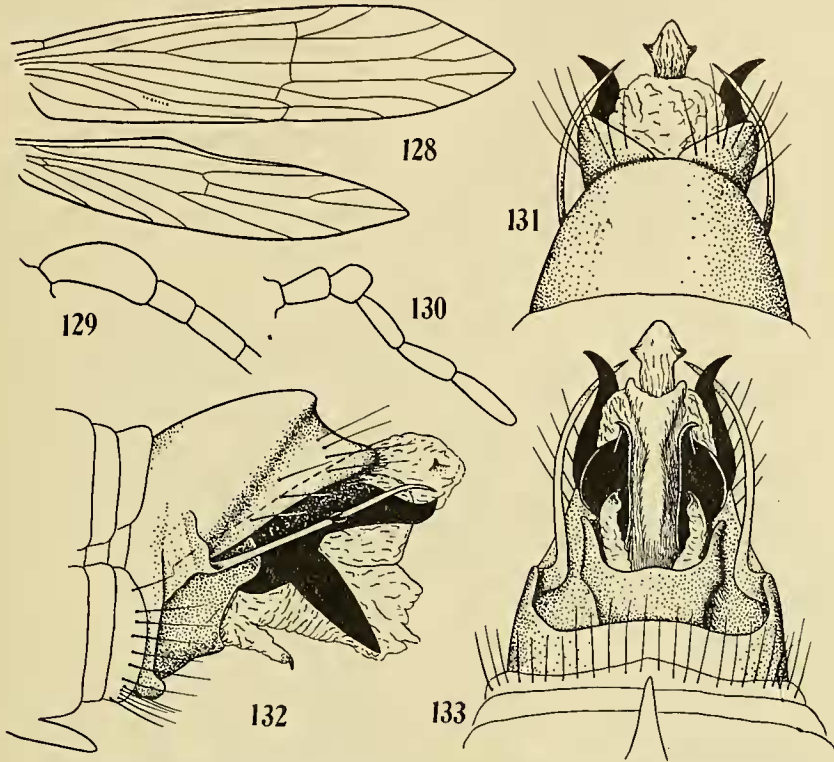
Genotype: *Canoptila bifida* sp. n.

6. **Canoptila bifida** sp. n. (text-figs. 128-133).

General characters as detailed in the generic description.

Genitalia ♂.—The ninth tergite is strongly produced in a large plate whose apical margin, widely excised from above, slopes downward, from the side, in a

concave sweep, lower margin straight; from near the hinder margin of the segment arises a pair of spine-like processes, incurved from above and beneath; penis membranous; upper penis-cover helmet-shaped; there are two pairs of very strong, black processes whose function in the genitalia is uncertain; lower



Canoptila bifida, ♂.—Fig. 128. Wings.—Fig. 129. Basal joints of the antenna.—Fig. 130. Maxillary palpus.—Fig. 131. Genitalia, dorsal.—Fig. 132. The same, lateral.—Fig. 133. The same, ventral.

penis-cover, seen in a wide excision of the ninth sternite, is comparatively narrow at its base, apical margin very wide, truncate, with the apical angles produced and bifurcate, partly membranous; a long, pointed process to the sixth sternite.

Length of the anterior wing ♂ 2.25 mm. 1.x.1937; one ♂.

Antoptila gen. n.

Spurs, 0, 4, 4. Ocelli present. Antennae twenty-three- or twenty-four-jointed in the ♂, basal joint long, slightly curved, next joint short, remaining joints all long, but not so long as that at the base. Maxillary palpi with the two basal joints short, the second globular, shorter than the first, each of the remaining joints about as long as the first and second together. Anterior wing long, costa and sub-costa more or less parallel, apical costal margin oblique, neuration regular but varying slightly in individuals in respect to the length of the forks; posterior wing long and narrow, costal margin slightly concave, fork no. 3 wanting.

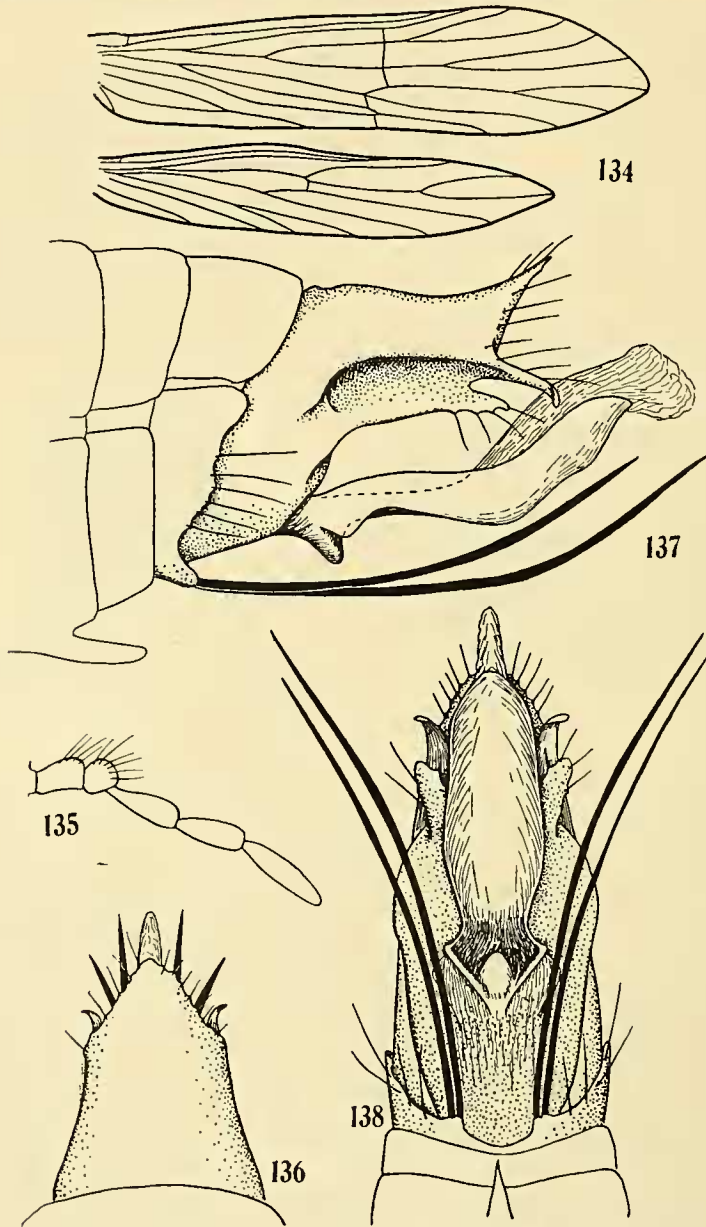
Genotype: *Antoptila brasiliiana* sp. n.

The genus is closely allied to *Mortoniella* Ulmer 1906. It differs in the posterior wing, where fork no. 3 is present in that genus.

7. *Antoptila brasiliانا* sp. n. (text-figs. 134-138).

Anterior wings chocolate-brown with no white markings as occur in *Mortoniella*. Other characters as given in the generic description.

Genitalia ♂.—Ninth tergite considerably produced, apex triangular, from



Antoptila brasilianna, ♂.—Fig. 134. Wings.—Fig. 135. Maxillary palpus.—Fig. 136. Genitalia, dorsal.—Fig. 137. The same, lateral.—Fig. 138. The same, ventral.

above ; from the side, the upper margin is sinuous, terminating in a tailwardly and upwardly directed, acute point ; the apical margin is obliquely truncate, with the lower angle produced in a pair of processes, set close together, the upper longer and more slender than the lower and curving over it ; penis obscure ; lower

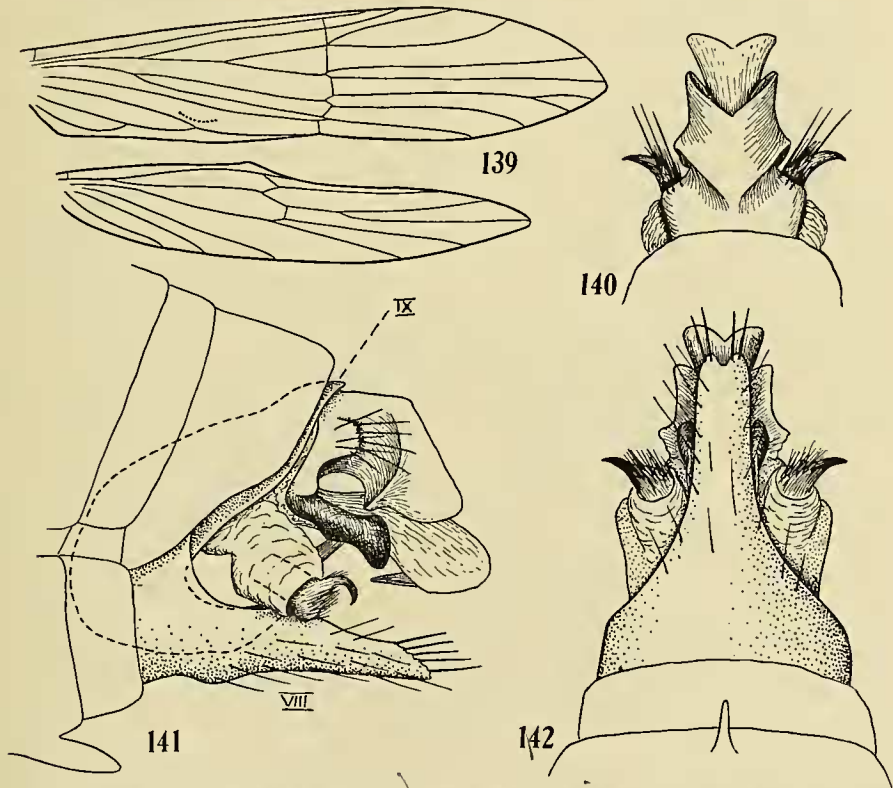
penis-cover long and sinuous from the side, with a projecting angle on its lower margin towards the base ; the apical margin of the eighth sternite is excised at the centre with the margin on each side of the excision slightly elevated and bearing four extremely long, black, wire-like bristles which extend to the apex of the genitalia ; a very strong process to the sixth sternite.

Length of the anterior wing ♂ 2.75 mm. ix-x. 1936, ii. 1937, iv. 1937, v. 1937, viii. 1937, x. 1937 ; numerous examples.

8. *Protoptila dubitans* sp. n. (text-figs. 139-142).

The shape of the wings and neuration as is usual in the genus.

Genitalia ♂.—The apical margin of the eighth tergite evenly rounded, sternite produced in a long, tapering process with a narrow, excised apex ; the ninth segment is somewhat retracted within the eighth ; the dorsal



Protoptila dubitans, ♂.—Fig. 139. Wings.—Fig. 140. Genitalia, dorsal.—Fig. 141. The same, lateral.—Fig. 142. The same, ventral.

margin is produced in a large plate with angular projections at the sides and a deeply excised apex, the excision commencing at the extreme apical angles ; from the side, the plate is deep with a blunt hook towards the centre of the lower margin and a projecting, rounded process, fringed with hairs towards the basal margin about midway ; arising from the lower basal angle, seen from the side, is a strong, black appendage (? intermediate) with a dilated, truncate apex and sinuous, lower margin ; penis membranous with a large hook on its under-surface, directed basally ; inferior appendage (?) arising from a broad, membranous base

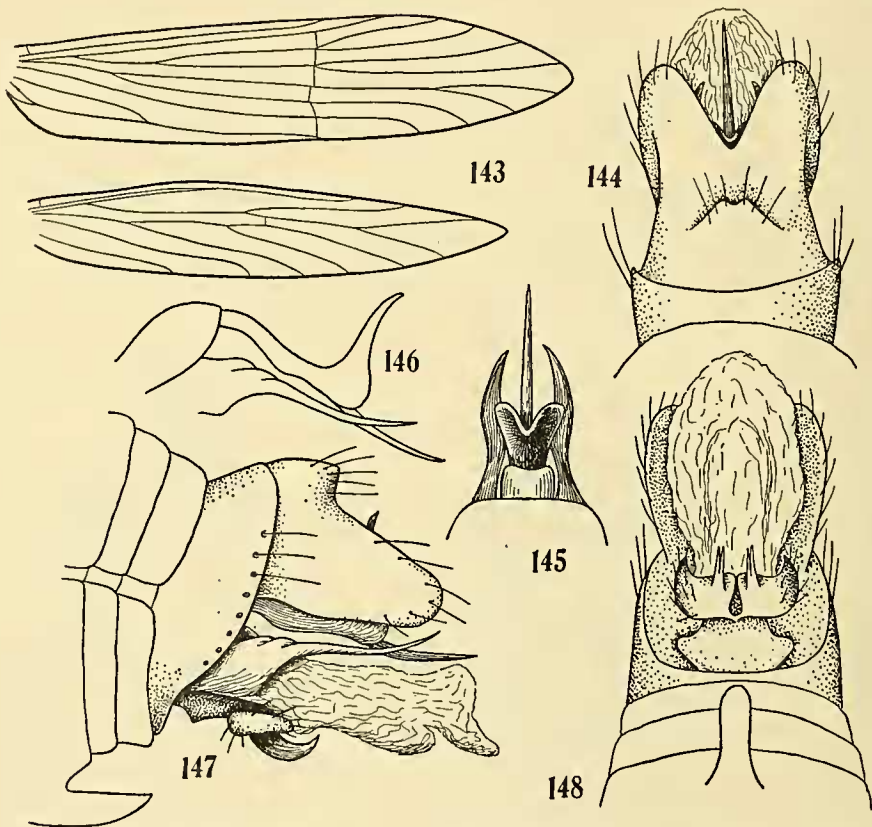
and terminating in a strong hook whose lower margin is heavily fringed; this hook appears to be inserted in its base in a socket; a strong process to the sixth sternite.

Length of the anterior wing ♂ 3 mm. 1.x.1937; one ♂.

9. *Mexitrichia ormina* sp. n. (text-figs. 143-148).

Wings slightly narrower than those of *M. unota* and *M. teutona*, with the anterior wing less dilated towards the apex.

Genitalia ♂.—Dorsal plate deeply excised at its apical margin to leave large, elongated lobes on each side of the excision; from the side, the plate is deep, with an angular projection along the upper margin towards its base; the plate tapers to a fairly broad, rounded apex; beneath it, seen in a balsam preparation, is an



Mexitrichia ormina, ♂.—Fig. 143. Wings.—Fig. 144. Genitalia, dorsal.—Fig. 145.—Upper penis-cover, etc., dorsal.—Fig. 146. The same, lateral.—Fig. 147. Genitalia, lateral.—Fig. 148. The same, ventral.

upper penis-cover, excised at its apex; the centre of this excision, as seen from the side, is produced in an upwardly directed, sinuous spine; beneath this, lying above a membranous penis, is a fine, straight spine; penis sheaths, from above, caliper-shaped, sinuous from the side; lower penis-cover formed of two wide plates; from beneath, each inner apical angle is produced in a pair of fine spines; there is a deep excision between the two plates with a rounded base; from the side, the inner angle appears as a stout, upcurving hook and there is an angular

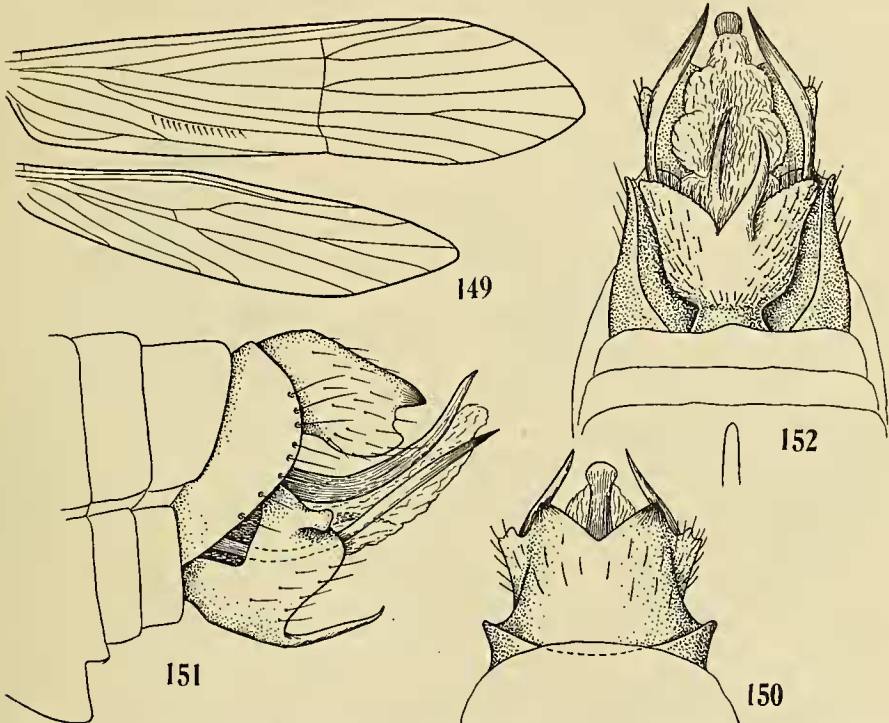
projection of the lower margin of the cover near the base ; a strong process to the sixth ventral segment.

Length of the anterior wing, ♂ 2 mm. 22.x.1937 ; one ♂.

10. *Mexitrichia teutona* sp. n. (text-figs. 149-152).

Insect brownish.

Genitalia ♂.—Extending beyond the margin of the ninth tergite is a dorsal plate with the apical margin sharply excised ; the plate is pent-shaped and from above, the sides project outwards in small, irregular shelves ; from the side, the distal margin is excised with a deep, rounded excision ; beneath, is a spatulate



Mexitrichia teutona, ♂.—Fig. 149. Wings.—Fig. 150. Genitalia, dorsal.—Fig. 151. The same, lateral.—Fig. 152. The same, ventral.

upper penis-cover with a dilated apex, curving upward from the side ; penis membranous with a pair of caliper-shaped sheaths, inclining slightly upward, from the side ; there is a single spine arising on the lower surface ; lower penis-cover widely excised at its broad apical margin, with a large, asymmetrically directed spine arising from the base of the excision ; from the side, the penis-cover is very deep, the spine arising from the lower angle ; a stout process to the sixth sternite.

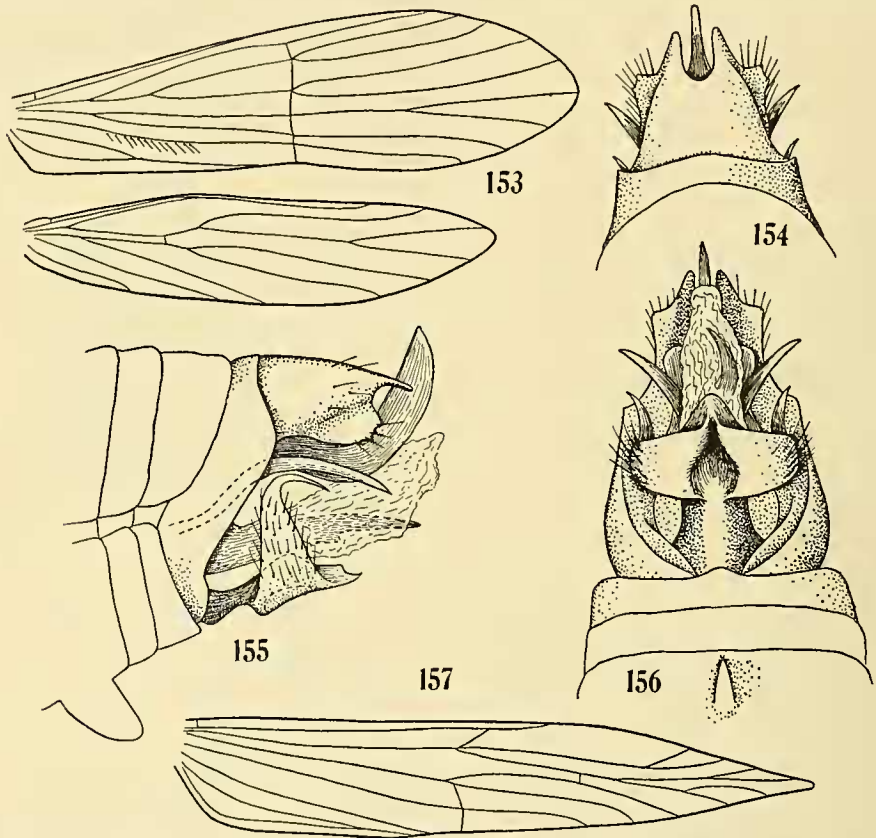
Length of the anterior wing, ♂ 3 mm. ix-x. 1936 ; 8. ii. 1937 ; 22. ii. 1937 ; 11. v. 1937 ; 1. xii. 1937 ; numerous examples.

11. *Mexitrichia unota* sp. n. (text-figs. 153-156).

Insect brownish.

Genitalia ♂.—The apical margin of the ninth tergite is rounded ; beyond it is a large dorsal plate, narrowing to its apex which is deeply excised to leave a

pair of finger-like projections separated by a U-shaped excision; the plate is pent-shaped, and, seen from the side, bears a large, rounded projection on its lower margin, separated from the finger-like process by a wide excision; beneath the dorsal plate may be seen a narrow, straight upper penis-cover which is blade-shaped and curves upward from the side; penis membranous with a strong spur on its lower surface; penis sheaths divergent from beneath, curving downward



Mexitrichia unota, ♂.—Fig. 153. Wings.—Fig. 154. Genitalia, dorsal.—
Fig. 155. The same, lateral.—Fig. 156. The same, ventral.
Abtrichia, ♀.—Fig. 157.—Anterior wing.

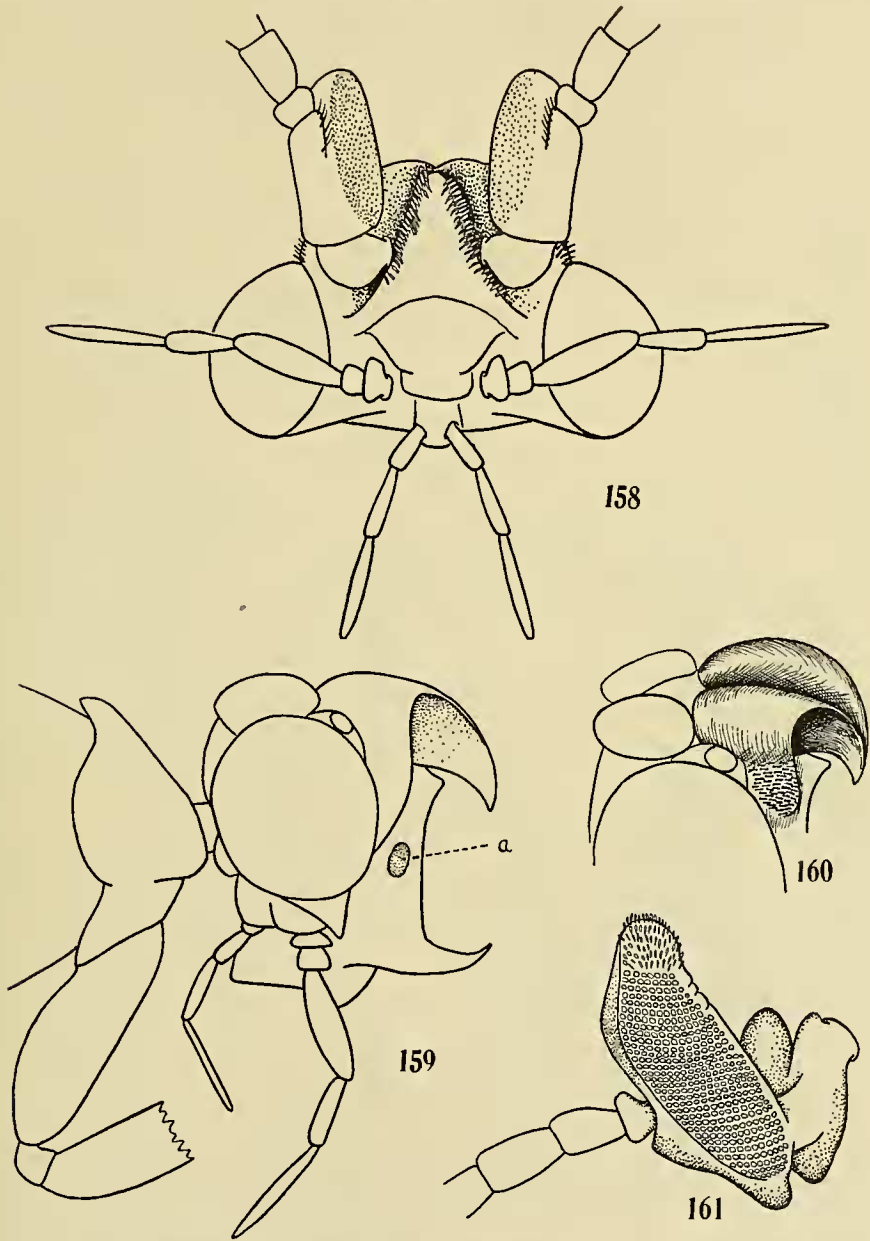
from the side; lower penis-cover (?) with a pair of wings, directed outwardly from beneath and upwardly from the side; from this aspect, the wing is triangular, its apex produced in a hooked spur directed distally, the lower distal angle produced and notched; the whole structure arises from a stem which is slender and constricted from the side, wide from beneath; a strong process to the sixth sternite.

Length of the anterior wing 4 mm. ix-x. 1936, 22. ii. 1937, 11. v. 1937, 8. viii. 1937, 1. xii. 1937; a series.

***Abtrichia* gen. n. (text-fig. 157, ♀).**

Insects large, with long, acuminate wings. Ocelli in both sexes two in number. Antennae very short, twelve jointed in the ♂, seventeen in the ♀. In the ♂, a large process arises from the side of the basal joint bearing an elaborate structure having the appearance of regular or irregular rows of minute round pits;

this process is much larger than the basal joint and has one or more membranous leaves attached to it; the basal joint is itself long, next joint very short, subsequent joints each about double its length. On the vertex of the head is a large



Abtrichia squamosa, ♂.—Fig. 158. Head, from in front.—Fig. 159. Head, palpi, etc., lateral, antenna removed (a = socket of antenna)—Fig. 160. Shield on the vertex of the head, viewed obliquely.—Fig. 161. Basal joints of the antenna much enlarged.

plate-like shield, from the side, with a down-curved, acute beak, and it bears on the dorsal surface a deep furrow down the centre; above the labrum is a plate which projects upwards towards the shield on the vertex and appears, from the side, as a strong spur with an acute apex, triangular from in front. Maxillary

palpi with the two basal joints short, the third nearly twice the length of the first and second together, fourth a little shorter than the third, fifth about as long as the third. In the anterior wing ♂, the costal margin is bent over the wing

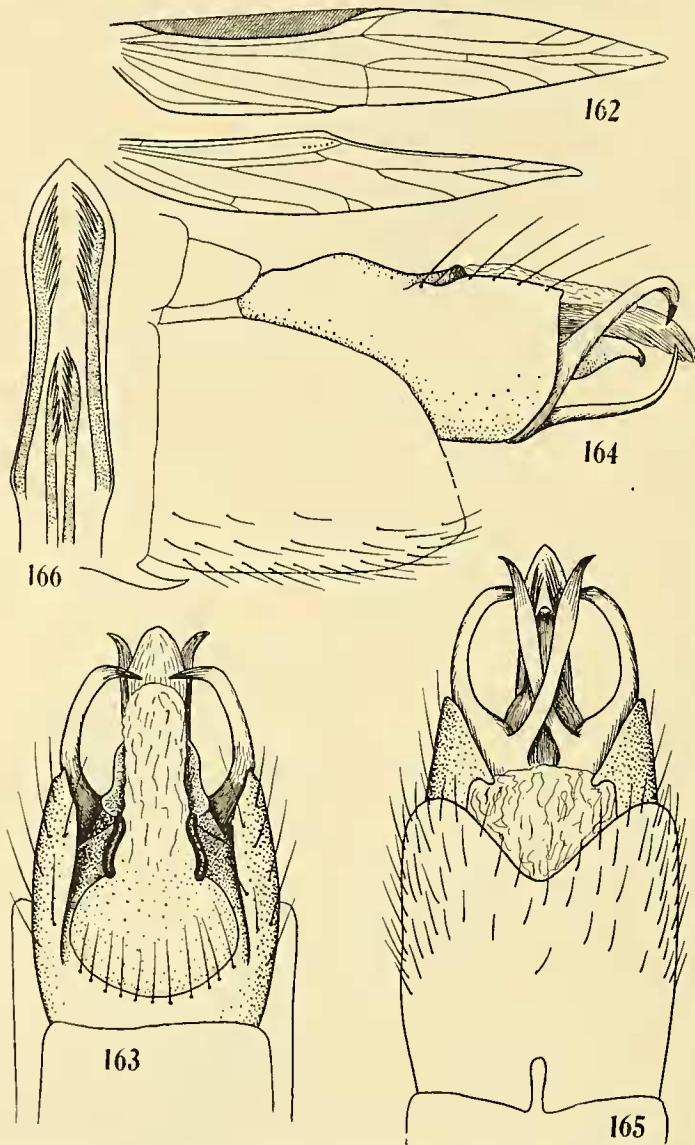
towards its base for nearly half its length to make a fold or pocket which, in *squamosa*, is filled with small scales, in *antennata*, with coarse hairs; in the ♀, and in the posterior wing in both sexes, the wing is normal; venation as shown in the figures. Spurs 1, 3, 4.

Genotype: *Abtrichia antennata* sp. n.

The genus is evidently allied to the Mexican *Zumatrichia* Mosely 1937, which is furnished with a plate to the basal joint of the male antenna and also has but two ocelli.

12. *Abtrichia squamosa* sp. n. (text-figs. 158-166).

Anterior wing clothed with brown or blackish hairs, intermixed with irregular patches of coarse white hairs, and numerous minute scales, particularly beneath the over-



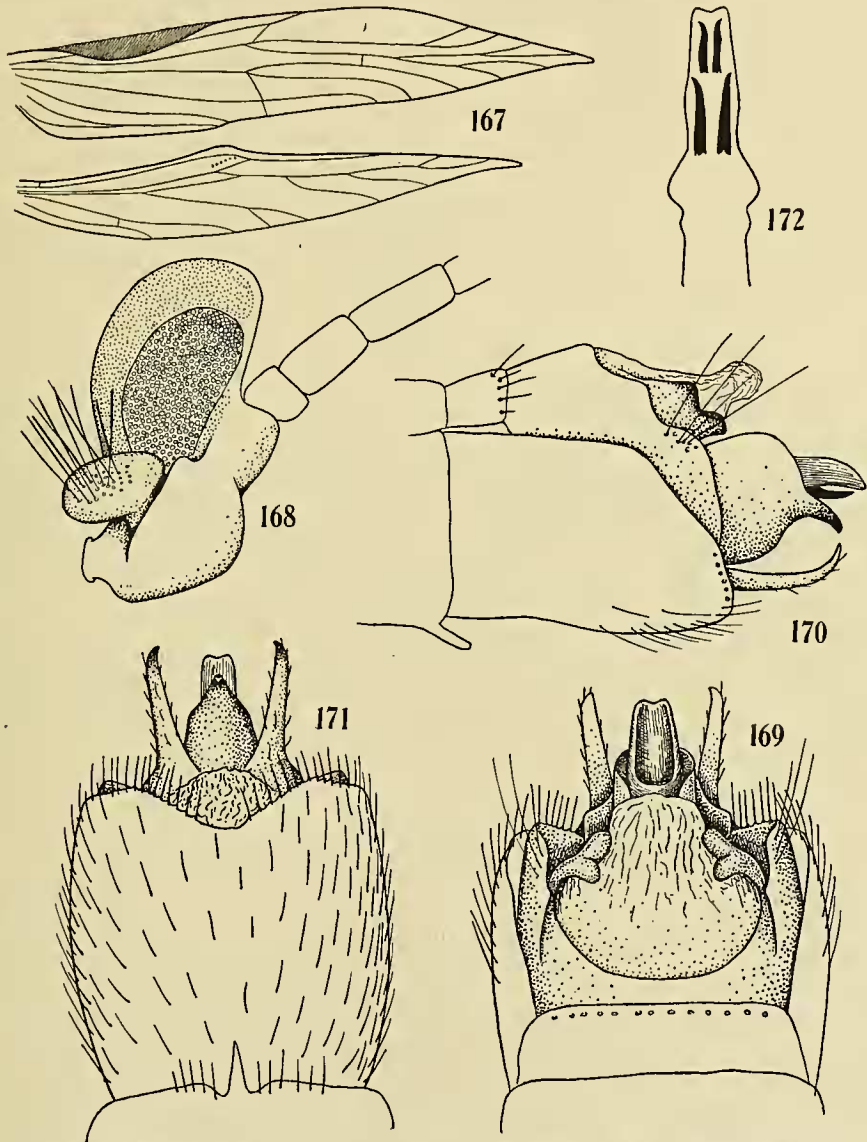
Abtrichia squamosa, ♂.—Fig. 162. Wings.—Fig. 163. Genitalia, dorsal.—Fig. 164. The same, lateral.—Fig. 165. The same, ventral.—Fig. 166. Penis, ventral.

lapping fold of the costa; apex of the wing acute but not particularly produced; posterior wing without scales. Other characters given in the generic description.

Genitalia ♂.—The apical margin of the ninth tergite deeply and roundly excised, the apical angles of the tergite produced in black, flattened, vertical ridges outside which the tergite is again produced in large, wide side-pieces; in the excision is a long, dorsal plate with rounded apical margin; penis stout and straight; in a balsam preparation are seen four bunches of feathery spines either

on its under-surface or perhaps contained within its walls ; these bunches are arranged in two pairs, one pair between, and shorter than the other ; lower penis-cover long, tapering to a blackened, hooked apex ; inferior appendages branched, the branches long and slender, upper branches with the apices bent nearly at right angles towards each other ; lower branch long and sinuous ; margins of both eighth and ninth sternites widely excised, ninth possibly open at the base of the excision ; a short, stout process to the seventh sternite, acute from the side.

Length of the anterior wing, ♂ 4 mm. 1.xii.1937 ; one ♂.



Abtrichia antennata, ♂.—Fig. 167. Wings.—Fig. 168. Basal joints of the antenna, much enlarged.—Fig. 169. Genitalia, dorsal.—Fig. 170. The same, lateral.—Fig. 171. The same, ventral.—Fig. 172. Penis, ventral.

13. *Abtrichia antennata* sp. n. (text-figs. 167–172).

Anterior wing clothed with brown or blackish hairs intermingles with patches of coarse, white hairs but without scales ; the fold of the costa is slightly shorter

than in *squamosa*; apices acute and produced in both anterior and posterior wings; antennae and palpi as in *squamosa*, but with a slightly different and more irregular pattern of pitting on the lobe of the basal joint of the antenna.

Genitalia ♂.—Eighth sternite considerably produced and strongly chitinized; ninth sternite broadly excised, the apical angles each bifurcate to make a pair of rounded forks of which the inner is blackened; outside these, the tergite is produced in large, rounded side-pieces which slope downward, from the side, with sinuous upper margins; in the excision is a membranous dorsal plate with truncate apical margin; penis straight, furnished either internally or on its under-surface with two pairs of strong, black spines, the basal the longer; lower penis-cover, from the side, globular at its base, apex produced in a blackened hook, the sides curving up over the dorsal surface of the penis; inferior appendages unbranched, rather short, straight and transparent; a strong process to the seventh sternite, blunt from the side but acute from beneath.

Length of the anterior wing, ♂ 4 mm. 1.xii.1937; one ♂.

There are in the collection two or three female examples belonging to either one or other of the species in this genus, but I can find no means of associating them with their respective males.

Acostatrichia gen. n.

Spurs 1, 3, 4. Ocelli present. Antennae about nineteen-jointed in the ♂, basal joint long, second short, remaining joints each longer than the second, nearly as long as the first. Maxillary palpi with the first and second joints very small, third slightly longer than the fourth, fifth nearly twice the length of the fourth. Anterior wing with a pouch along the costa near the base, filled with broadened hairs, neuration as figured. In the ♂, the seventh sternite bears a pair of small, acute processes, one situated immediately behind the other.

Genotype.—*Acostatrichia plaumanni* sp. n.

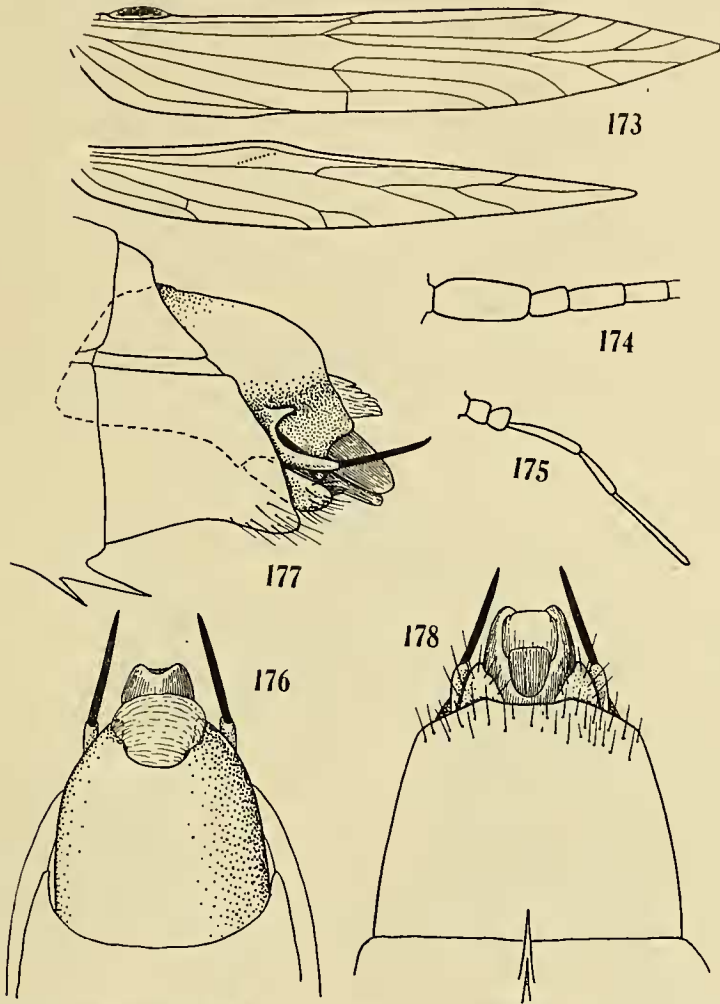
Acostatrichia is closely related to the Mexican genus *Costatrichia* Mosely 1937, differing in neuration, more particularly in that of the anterior wing, and also in the normal antennae which, in the latter genus, are considerably dilated at their centre. This may, however, be a specific rather than a generic character.

14. *Acostatrichia plaumanni* sp. n. (text-figs. 173–178).

Anterior wing bearing large patches of coarse, white hairs. Other characters as detailed in the generic description.

Genitalia ♂.—The apical margin of the ninth tergite excised with a nearly circular excision, the edges of which are partly obscured by a membranous dorsal plate or, perhaps, an upper penis-cover; beyond this is a more strongly chitinized structure with a broad, excised apical margin, probably the penis and lower penis-cover together; from the side, the eighth segment is cut back so that its apical margin is very oblique; the ninth segment, from the side, slopes slightly downward, its apical margin slightly excised to form a downwardly directed finger at its lower apical angle; on its lower margin, from the same aspect, towards the centre, is a pair of finger-like processes, the lower the longer and bearing a thick, black spine which is the most noticeable feature of the genitalia; inferior appendages small and triangular; apical margin of the eighth sternite not excised at its centre; a paired process to the seventh sternite.

Length of the anterior wing, ♂ 2.5 mm. ix-x.1936, ii.1937, iv.1937, viii.1937, xii.1937 ; a series.



Acostatrichia plaumanni, ♂.—Fig. 173. Wings.—Fig. 174. Basal joints of the antenna.—Fig. 175. Maxillary palpus.—Fig. 176. Genitalia, dorsal.—Fig. 177. The same, lateral.—Fig. 178. The same, ventral.

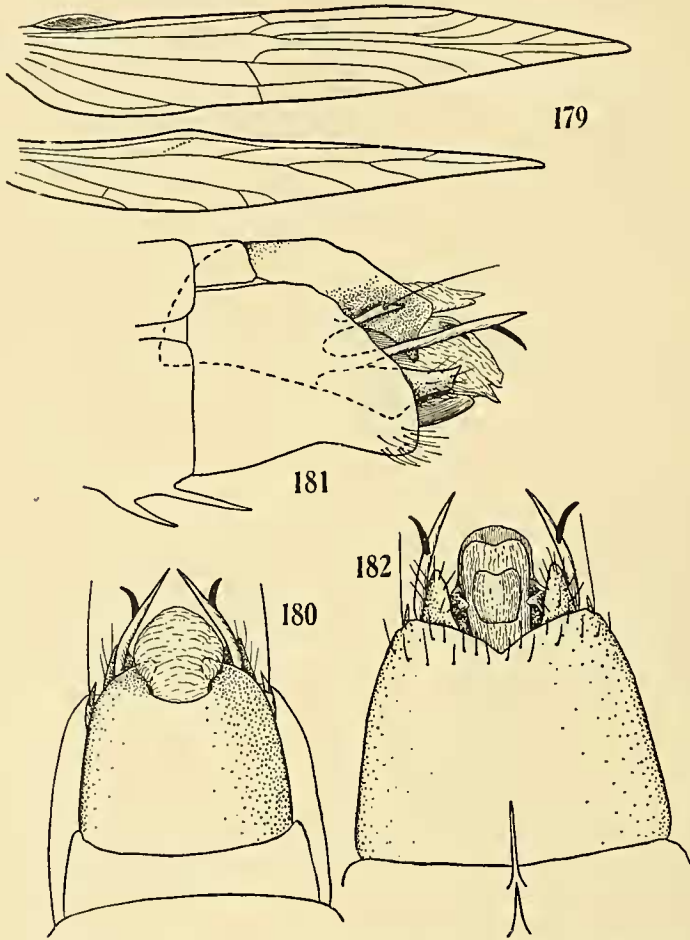
I have pleasure in dedicating this species to Dr. Fritz Plaumann, who has collected extensively for the British Museum in Brazil.

15. *Acostatrichia simulans* sp. n. (text-figs. 179-182).

Anterior wing resembling that of *A. plaumanni* in being variegated with patches of white ; the costal pouch is more conspicuous than in that species and bears a larger mass of yellow hairs.

Genitalia ♂.—The apical margin of the ninth tergite excised as in *plaumanni* ; the bases of the large, black spines of that species are, in *simulans*, represented by long, transparent, slender processes, each with a short, stout, black and slightly curved spine situated towards the apex ; these processes curve towards each other, caliper fashion, so that their apices nearly meet ; a second finger-like process

is situated above as in *plaumanni* and is furnished with one or a pair of fairly long bristles; inferior appendages short and triangular; apical margin of the eighth sternite excised at its centre; processes of the seventh sternite paired, the distal the longer.



Acostatrachia simulans, ♂.—Fig. 179. Wings.—Fig. 180. Genitalia, dorsal.—Fig. 181. The same, lateral.—Fig. 182. The same, ventral.

Length of the anterior wing, ♂ 2 mm. ix-x.1936, 8.ii.1937, 25.iv.1937, 1.xii.1937; several examples.

The black spines of the processes of the ninth segment are easily shed so that it has been difficult to find an example in the collection having both present. When the spines are wanting, the species is less easy to recognise.

Betrichia gen. n.

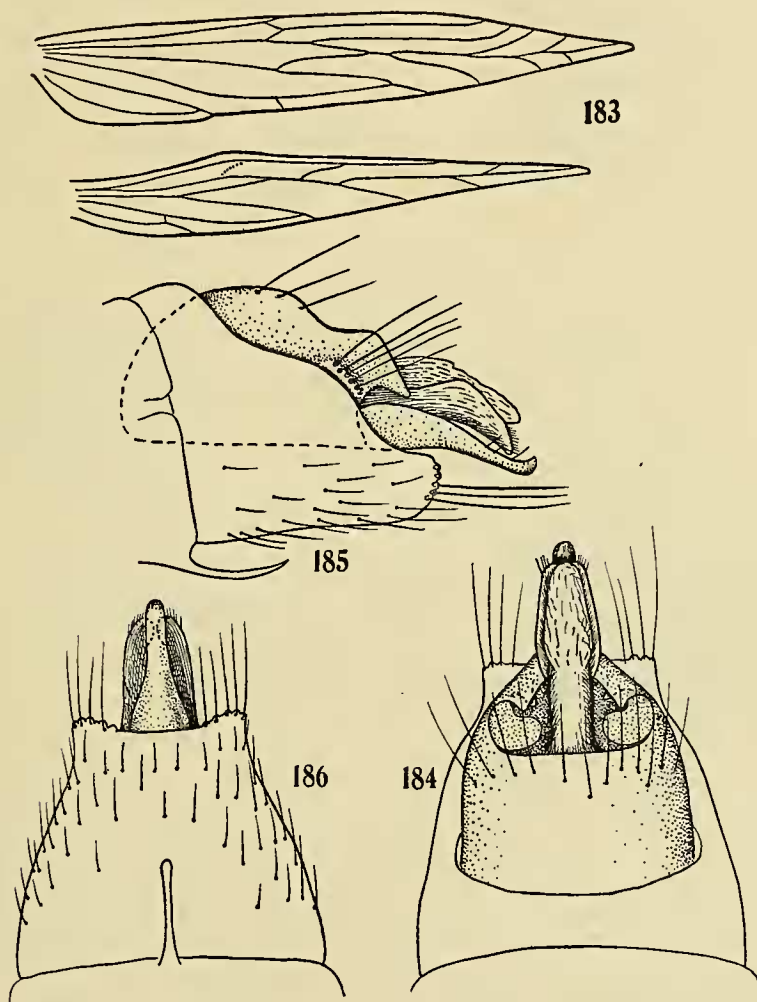
Ocelli present. Antennae ♂ short, only nineteen-jointed, basal joint long, next three joints shorter than each of the remaining joints. Maxillary palpi wanting in the single example of the species available. Wings elongate with acute and somewhat produced apices, venation as figured. Spurs 1, 3, 4.

Genotype, *Betrichia zilbra* sp. n.

16. *Betrichia zilbra* sp. n. (text-figs. 183–186).

General characters as given in the generic description.

Genitalia ♂.—The apical margin of the eighth tergite deeply excised ; in the excision, from above, is seen the ninth tergite whose apical margin is shallowly excised, the apical angles produced in a pair of rounded and irregular lobes ; beyond these is a pair of processes whose attachments are obscure ; from the side,



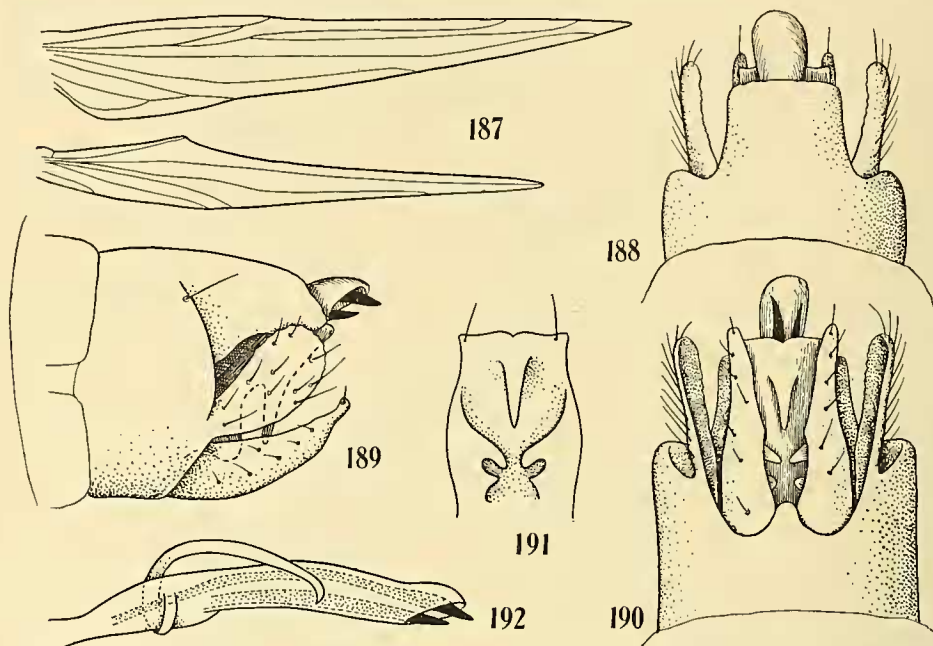
Betrichia zilbra, ♂.—Fig. 183. Wings.—Fig. 184. Genitalia, dorsal.—Fig. 185. The same, lateral.—Fig. 186. The same, ventral.

the eighth sternite is strongly produced, the upper margin sloping sinuously downward to a truncate apex whose margin is serrate and fringed with a few long bristles ; from the side is seen a membranous penis furnished with a pair of stout sheaths, strongly fringed at their apices ; lower penis-cover long and sinuous ; from beneath, the eighth sternite is strongly produced, apical margin truncate and somewhat concave, with long bristles at the apical angles ; process of the seventh sternite long and slender, very acute from the side.

Length of the anterior wing, ♂ 3 mm. ix-x.1936 ; one ♂.

17. *Exitrichia noteuna* sp. n. (text-figs. 187-192).

Genitalia ♂.—The apical margin of the ninth tergite produced at its centre in a rectangular dorsal plate ; in the angles formed between the base of the plate and the margin of the tergite appear the long, finger-like side-pieces of the tergite ; these, from the side, are broad and rounded, arising from constricted bases ; beneath the dorsal plate is the apex of the penis, furnished with a pair of black



Exitrichia noteuna, ♂.—Fig. 187. Wings.—Fig. 188. Genitalia, dorsal.—Fig. 189. The same, lateral.—Fig. 190. The same, ventral.—Fig. 191. Lower penis-cover, ventral.—Fig. 192. Penis, lateral.

spines ; lower penis-cover large, with a truncate apex and with a large, downwardly directed process arising from its under-surface towards the centre ; the sides of the penis-cover, from beneath, are turned under to overlap partly the under-surface ; the overlapping part is triangular with the apex deeply excised ; inferior appendages long, broad at the bases, tapering to subacute apices ; the margin of the ninth sternite produced at its centre in a small process with a rounded apical margin.

Length of the anterior wing, ♂ 2 mm. ix-x. 1936, 15. iv. 1937, 11. v. 1937, 8. viii. 1937, 1. x. 1937 ; numerous examples.

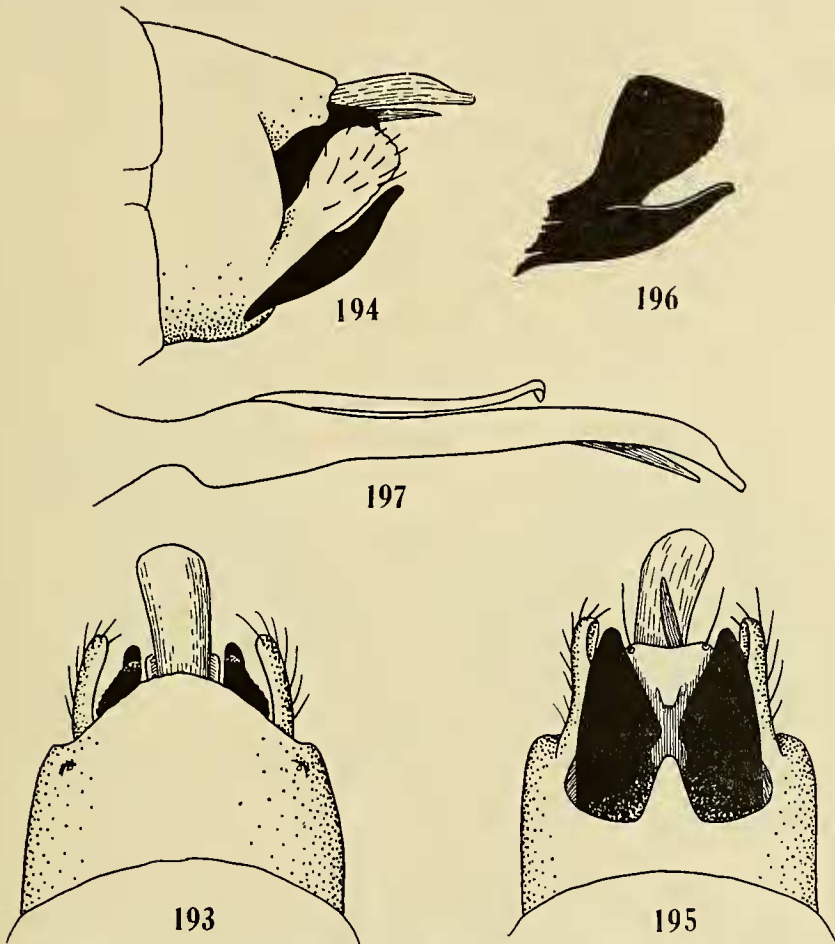
18. *Exitrichia novara* sp. n. (text-figs. 193-197).

Insect very small and brownish.

Genitalia ♂.—The apical margin of the ninth tergite slightly produced and rounded ; side pieces of the segment with the apices only slightly dilated ; penis slender, with a black spine, apex dilated from above ; lower penis-cover with a truncate apical margin with a bristle at each apical angle and an angular, downwardly directed process about the middle of the under-surface ; inferior appendages black, branched, broad and triangular from beneath ; from the side, the

upper branch is very stout, apex greatly dilated, with a truncate apical margin, lower branch comparatively slender; apical margin of the ninth sternite produced at its centre in a slender triangle.

Length of the anterior wing, ♂ 2 mm. ix.-x. 1936, i. x. 1937; two ♂♂.



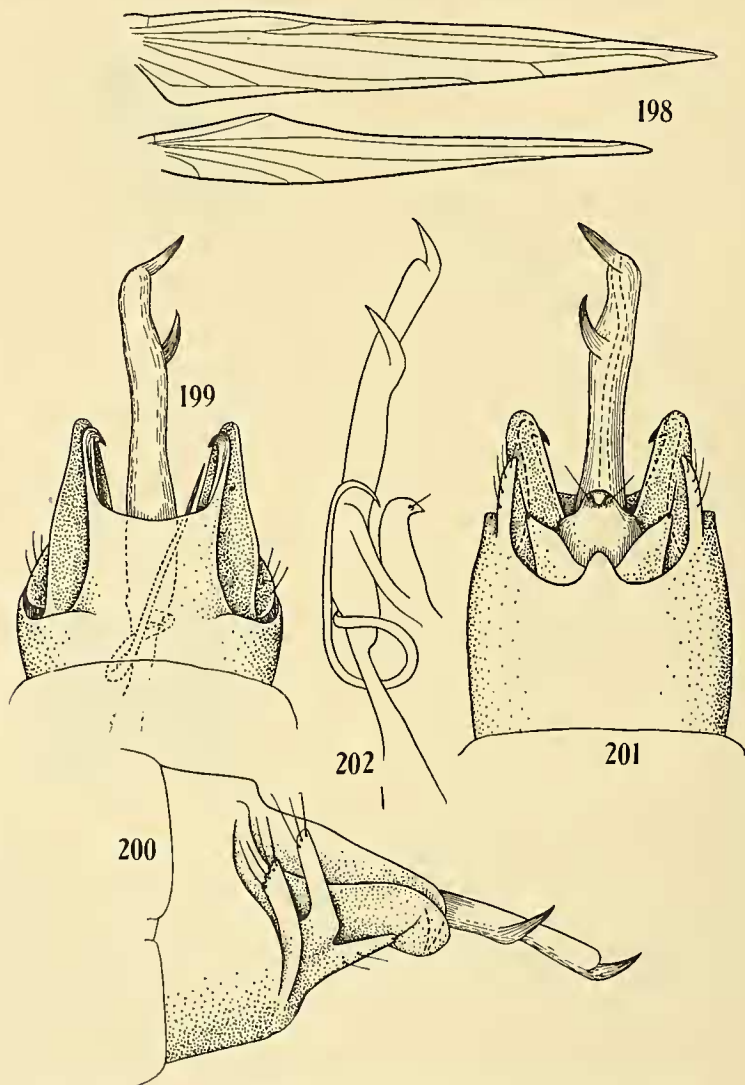
Exitrichia novara, ♂.—Fig. 193. Genitalia, dorsal.—Fig. 194. The same, lateral.—Fig. 195. The same, ventral.—Fig. 196. An inferior appendage, lateral.—Fig. 197. Penis, lateral.

19. *Exitrichia ovona* sp. n. (text-figs. 198–202).

There appears to be an additional fork in the anterior wing of *ovona* as compared with the neurotation in the genotype, the Mexican species *E. anahua*, but the neurotation is so indistinct that, as the new species is represented by only a single example, I have considered it better to retain it in *Exitrichia* until more material should be available for study. The genitalia, however, are scarcely reconcilable with the typical *Exitrichia* pattern.

Genitalia ♂.—From above, the apical margin of the ninth tergite is produced in a rectangular dorsal plate whose apical margin is cut away in a wide, semi-circular excision to leave the angles of the plate produced in slender processes with down-hooked apices; beneath this are slightly longer processes which may

be the produced side-pieces of the ninth tergite ; penis long, with a pair of blackened hooks directed laterally, rather widely separated and situated towards the apex ; lower penis-cover triangular with its apex turned down in a broad hook with a single bristle on each side ; inferior appendages short and triangular ; apical margin of the ninth sternite bearing a small, triangular projection at its



Exitrichia ovona, ♂.—Fig. 198. Wings.—Fig. 199. Genitalia, dorsal.—Fig. 200. The same, lateral.—Fig. 201. The same, ventral.—Fig. 202. Penis and lower penis-cover, lateral.

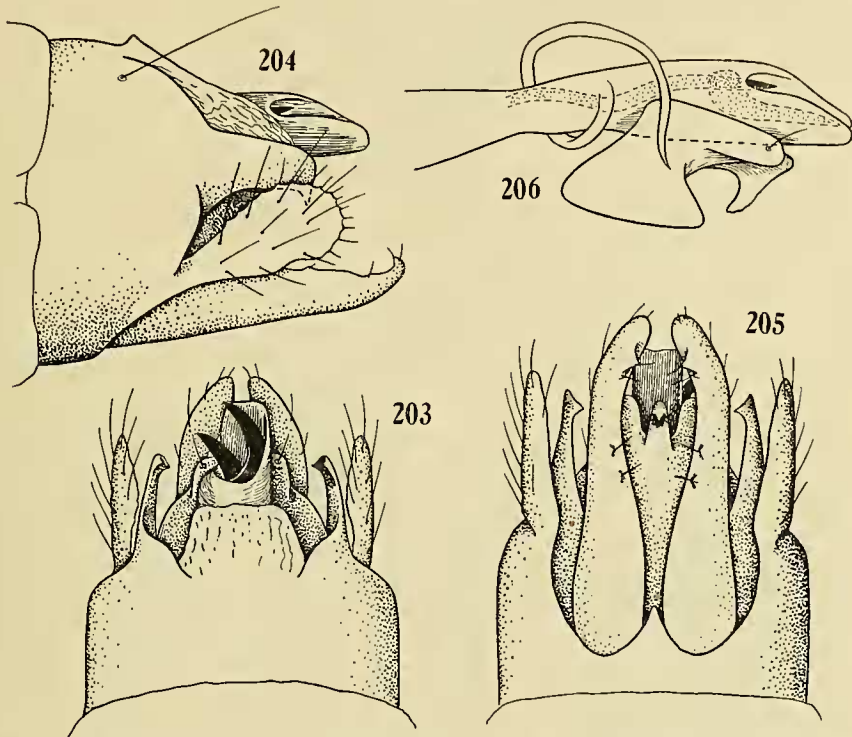
centre and with its lateral angles produced in slender processes ; from the side, a pair of processes may be seen, elbowed towards the base and directed upward ; these may be connected with the inferior appendages, but there is not sufficient material available for a complete investigation of these structures.

Length of the anterior wing, ♂ 2 mm. 1. x. 1937 ; one ♂.

The figures of this species are not entirely satisfactory owing to lack of material.

20. *Exitrichia tertia* sp. n. (text-figs. 203–206).

Genitalia ♂.—The apical margin of the ninth tergite very widely excised; in the centre of the excision is a nearly square, membranous dorsal plate; the angles of the excision are produced in straight processes with the apices concave, the upper and lower apical angles acutely pointed; side-pieces of the ninth segment long, gradually dilating from a slender base to a broad, rounded apex; penis retracted, furnished with a pair of stout, black apical claws emerging from



Exitrichia tertia, ♂.—Fig. 203. Genitalia, dorsal.—Fig. 204. The same, lateral.—Fig. 205. The same, ventral.—Fig. 206. Penis and lower penis-cover, lateral.

an obliquely cut sleeve; lower penis-cover trifurcate, the central fork, from the side, appearing as a large, downwardly directed hook; a single bristle on each of the outer forks; inferior appendages very large, slightly sinuous, apices approaching each other and rounded, with a small, projecting angle on each under-surface near the apex; apical margin of the ninth sternite deeply excised with the centre produced in a triangular process.

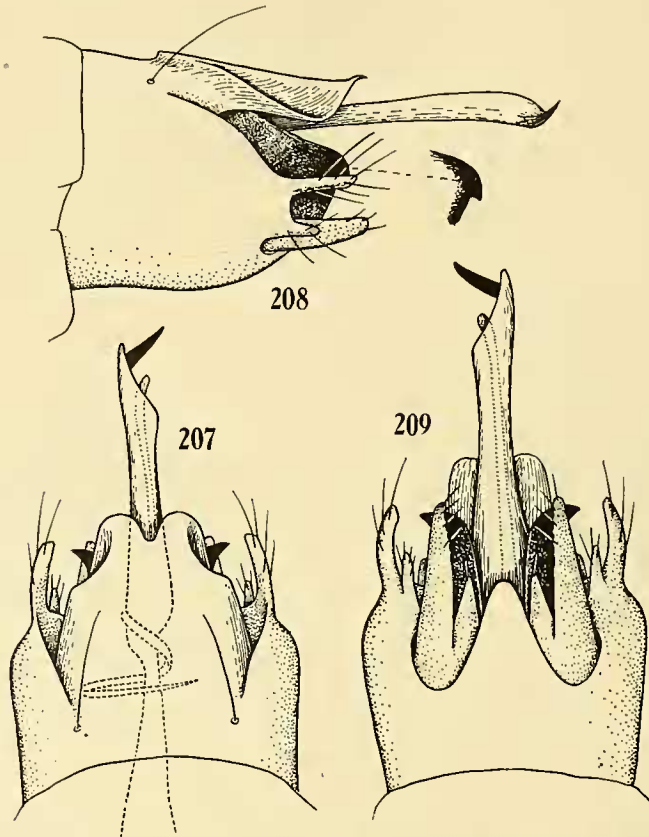
Length of the anterior wing, ♂ 2 mm. ix-x. 1936; two ♂♂.

21. *Dolotrichia* (?) *dubitans* sp. n. (text-figs. 207–209).

The species *dubitans* departs somewhat from the typical pattern in the shape of the dorsal plate as the apical angles are not produced in strongly chitinized hooks.

Genitalia ♂.—The apical margin of the ninth tergite is produced in a large dorsal plate whose apical margin is excised to leave two wide, rounded lobes; from the side, the apex is produced and slender; beneath the plate is a long penis

with an obliquely truncate apex or sleeve from which protrudes a single, blackened spur; there is an internal duct whose apex slightly projects beyond the margin at the apex; beneath the penis is a pair of stout, blackened processes whose apices are out-turned; these processes are very deep from the side, with hooked apices; inferior appendages from beneath, bifurcate, outer forks nearly



Dolotrichia dubitans, ♂.—Fig. 207. Genitalia, dorsal.—Fig. 208. The same, lateral.—Fig. 209. The same, ventral.

twice the length of the inner, with serrate inner margins towards the apices; the inner forks are each armed at the apex with a single bristle; side-pieces of the ninth segment bifurcate; from the side, the upper fork is widely separated from the lower by a rectangular excision and is twice its length; the apices of each armed with long bristles; apical margin of the ninth sternite widely excised and with the centre produced in a long triangular process.

Length of the anterior wing, ♂ 2 mm. 25. iv. 1937; one ♂.

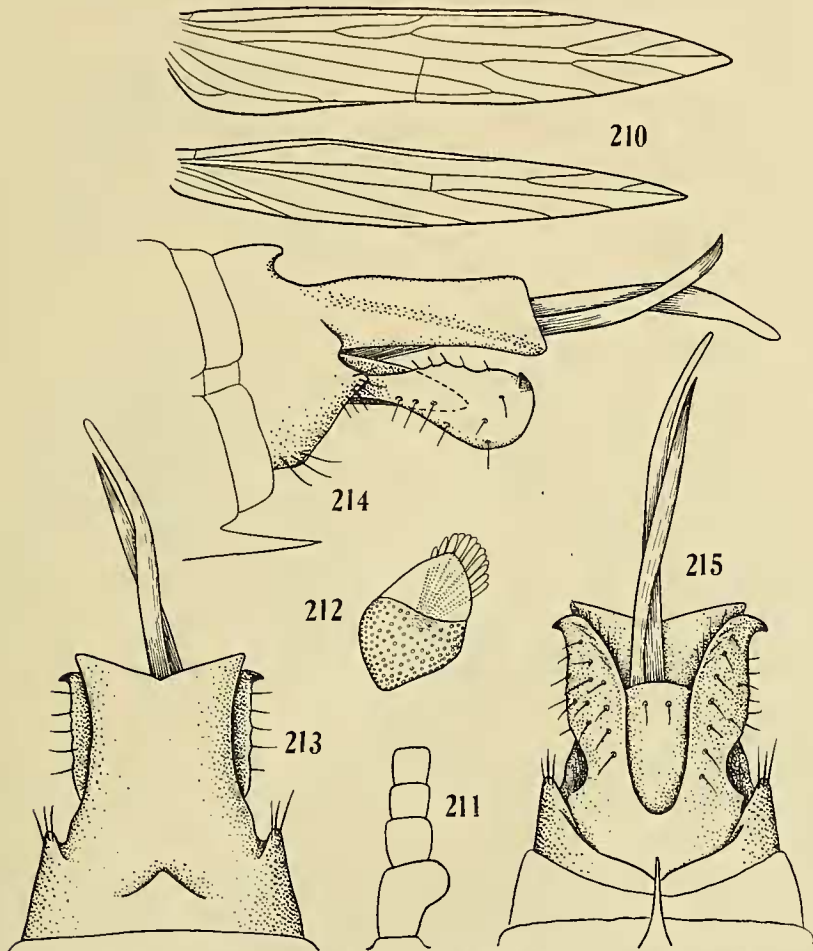
Although this species scarcely conforms with the generic diagnosis, yet, as it is represented by a single example only, it seems undesirable to erect a new genus, until more material shall be available.

22. *Hydroptila producta* sp. n. (text-figs. 210–215).

The species belongs to the *sparsa* group. Antennae, thirty-seven-jointed in the ♂, basal joint large, irregularly dilated at one side of its apex, second joint

about twice as long as the third, which is slightly shorter than each of the remaining joints; scent-organ consisting of a pair of eversible filaments fringed with unusually broad scent-hairs; the scent-organ cap of the usual acorn-pattern, the cup being much larger than the acorn.

Genitalia ♂.—Dorsal plate very large and broad, the apical margin excised from the extreme apical angles; an angular projection towards the centre of the



Hydroptila producta, ♂.—Fig. 210. Wings.—Fig. 211. Basal joints of the antenna.—Fig. 212. Scent-organ cap and scent-hairs.—Fig. 213. Genitalia, dorsal.—Fig. 214. The same, lateral.—Fig. 215. The same, ventral.

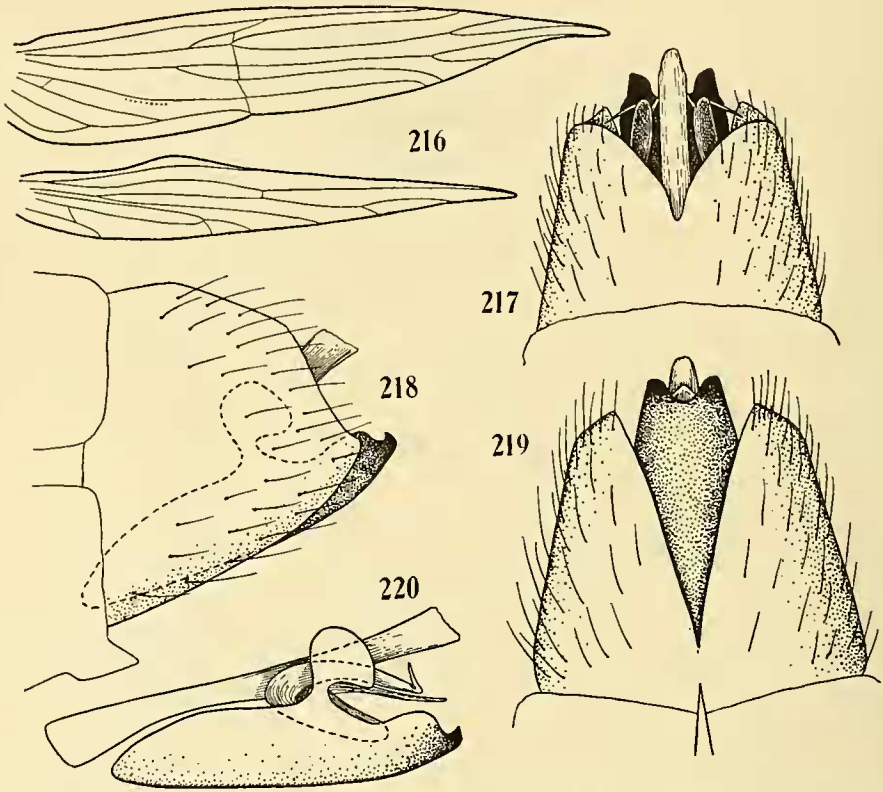
dorsal basal margin; side-pieces of the ninth segment small; penis long and straight, with a single long spine lying more or less parallel with it and slightly shorter, the usual, twisted, apical hook wanting; inferior appendages with the apices, from the side, considerably dilated, with a blackened apical hook on the upper apical angle, directed outward as seen from beneath, margins fringed with widely spaced bristles; lower penis-cover rounded, with a pair of minute bristles slightly below the centre of the apical margin; an acute process to the seventh sternite.

Length of the anterior wing, ♂ 2 mm. 8. ii. 1937, 11. v. 1937, 1. xii. 1937; several specimens.

23. *Loxotrichia zilaba* sp. n. (text-figs. 216–220).

Neuration conforming with the Mexican pattern.

Genitalia ♂.—The eighth tergite is very hairy with the apical margin deeply excised from the outer angles ; in the centre of the excision, is a straight penis, below which, on each side, is an elongate, oval process with a slender, out-



Loxotrichia zilaba, ♂.—Fig. 216. Wings.—Fig. 217. Genitalia, dorsal.—Fig. 218. The same, lateral.—Fig. 219. The same, ventral.—Fig. 220. Penis, etc., with the ninth sternite.

stretched spine arising from each apex ; ninth sternite produced and narrow, its apical margin excised as seen from above and beneath, forming a short claw from the side ; eighth sternite with a deep V-shaped excision ; a strong, pointed process to the seventh sternite.

Length of the anterior wing, ♂ 2.5 mm. ix-x.1936 ; one ♂.

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